

**SCOPE OF WORK
CITY OF TIGARD
ENGINEERING SERVICES FOR
2014 PAVEMENT MANAGEMENT PROGRAM**

Background

The City of Tigard's transportation system includes about 152 miles of City-owned surface streets of varying size and capacity requiring periodic maintenance to keep them operational. The City established a Street Maintenance Fee in 2003 to address maintenance needs for these streets. A significant portion of the fees collected are to be spent on reconstruction/restoration of existing roadways. MSA provided services to the City in 2013 to complete pavement rehabilitation designs initially started by the City, and provided full design and construction administration services to the City in 2014.

Project Description

This project will include the design and construction of streets identified for pavement rehabilitation in 2015. Street segments being considered for pavement rehabilitation are listed below in Table 1. This list represents the "200%" list relative to available funding. Streets are generally in order of priority based on current information. It is expected that this list will be reduced to fit available funding.

Key Assumptions:

- Geotechnical information will be developed for the 200% list shown below.
- Project designs will be developed only for the reduced 100% list (currently assumed to be Old Gaarde through Summercrest Drive).
- Total curb ramps to be evaluated and (re)constructed will be approximately 115 based on the anticipated 100% list.
- Curb ramps designs will be developed to approximate total footprint for bidding purposes. Final layout will be coordinated in the field with the contractor to meet the public right of way accessibility guidelines.

Table 1: 200% Street List

Street	From	To	ADT	Heavy	Length	Area	Curb Ramp Corners
Gaarde (Old)	Gaarde	Hwy 99W	2,500	30	450	16200	2
North Dakota	Gallo	Springwood	2,600	30	4,000	120000	35
115th	50's of N.	Cottonwood Ln	1,600	10	900	51200	6
92nd Ave	Durham	Waverly	3,000	60	1,500	66000	8
Nimbus Ave	Scholls Ferry	End	3,000	60	1,150	55200	2
72nd Ave	217 Ramps	Beveland	1,3000	650	900	32400	6
Dartmouth St	99W	Atlanta	8,000	250	310	14880	1
78th Ave	Pfaffle	99W	8,000	200	330	13200	2
72nd Ave	99W	McD's Dwy	10,000	400	400	20000	2
Walnut St	99W	Tiedman	9,000	200	3,000	108000	14
Springwood Dr	East of 121st	Scholls Ferry	1,200	12	2,400	76800	21
Summercrest	Tigard Dr	North Dakota	900	10	2,100	63000	10
Ventura Ct	Barbara	Alfred	800	10	1,450	46400	2
74th	Barbara	Taylors Ferry	700	10	1,500	42000	5
Landmark Ln	72nd Ave	End	600	60	700	26600	1
96th Ave	Murdock	Sattler	800	30	900	24300	3
Kable	98th	100th	1,200	15	700	23800	4
109th Ave	Highland	Naeve	800	10	300	9600	6
Fanno Creek Dr	Bonita	80th	1,000	12	1,200	38400	6
Grant Ave	Walnut	McKenzie	1,500	20	450	14400	1
Grant Ave	Johnson	Tigard	2,200	20	1,100	37400	1
Oak St	Hall	90th	2,000	30	1,400	42000	2
Oak St	69th	71st	600	10	820	21320	0
Brookside Dr	Walnut	Johnson	500	5	950	30400	3
Frewing St	Ash Ave	O'Mara	400	4	2,000	18000	0
Grant Ave	Park St	School St	400	4	700	21000	3
Sub-Total						1,032,50	146

The City anticipates having the following construction budget (design and construction engineering services separate) available for this work.

Fiscal Year (Construction Year)	Construction Budget
2015-16 (2015)	Approximately \$1,300,000

The Consultant will develop pavement rehabilitation designs and produce a bid package to complete this work and incorporate City comments as received. Typical street treatments are expected to be overlays, grind and inlays, and localized pavement repairs if needed.

City Responsibilities

The City will be responsible for the following:

- Reduce 200% street list to 100% list for use by consultant in developing designs.
- Provide a project engineer/manager who is responsible for overall project development and management and for coordination between the consultant and the City.
- Establish the work scope and design parameters for each project, including the final street list and required standards.
- Provide the Consultant copies of all available, relevant City utility "as-built" plans, topographical maps, reports and studies pertinent to the project.
- Provide Consultant with GIS technical support including a base map based upon coordinate geometry with aerial photography and topographic contours.
- Provide Consultant with the City's standard drafting frame, title block and any standards required to be followed if applicable.
- Provide Consultant with digital copies of the City's standard construction specifications, details and "front end" bidding document sections.
- Provide the Consultant with average daily traffic and percent heavy vehicles for each street. Collaboratively work with Consultant to determine reasonable distribution of heavy vehicle classifications.
- Participate in field walk through with Consultant staff to verify pavement rehabilitation treatments.
- Provide timely review and comment on drawings, bid items and quantities, and estimate submitted by Consultant to City for review and approval.
- Maintain records and process consultant invoices.
- Provide legal review of all contracts, bid forms, and real property.
- Provide notifications as necessary to the public and business community regarding the nature and timing of the work to be completed.
- Advertise and manage the bidding process for construction.
- Review and approve contractor payments and any construction contract change orders.
- Provide public notifications regarding construction schedule and impacts.
- Perform final inspection and provide feedback for punchlist items.

Proposed Scope of Services

The scope of design services for the contemplated work is presented below.

City of Tigard

MURRAY, SMITH & ASSOCIATES, INC.

2015 PMP

November 2015

Engineers/Planners

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Task 1 – Project Management

This effort covers the administration and coordination of the Consultant's staff, subconsultants, and the interface with the City project manager and other City staff. The effort will include the following subtasks:

- Schedule, prepare for, and conduct a project kick-off meeting to review the purpose and scope of the project.
- In addition to the project kickoff meeting, budget assumes two (2) additional meetings. The meetings will occur after the 50% submittal and after the 90% design submittals respectively. Consultant shall schedule and lead project meetings and prepare meeting agendas and minutes. For estimating purposes, it is assumed two (2) MSA team members will be present at each team meeting.
- Coordinate submittal and review of plans, bid items and quantities, and estimate by the City at the 50% and 90% level of completion.
- Process and submit monthly billings with a summary of project status by task and subtask, including a summary of invoicing from subconsultants retained for this project.
- Preparation and maintenance of the overall project schedule including adding staff, subconsultants and other resources as needed to meet scheduled milestones.

Task 1 Deliverables

- Invoices (monthly)
- Project Design Schedule
- Meeting agendas and minutes for meetings

Task 2 - Surveying

Task 2.1 Preliminary Monument Research

Since grind/inlay and overlay pavement rehabilitation has the potential to disturb existing monument, research will be completed to determine which monuments may be affected. It is also possible property corners may be disturbed as part of curb ramp construction. To minimize the risk of disturbance, work will include:

- Research Washington County survey records for recorded surveys, subdivision plats and road drawings that show the location of all survey monuments and property corners that have been previously set within the work limits.
- Research City of Tigard Benchmark records that describe the location of any city benchmarks in the areas of construction.
- Field verify presence of monuments, property corners and benchmarks.
- Using the research described above, provide a markup of the approximate locations on the project plans and incorporate this information into the plans in the 90% design documents (Task 6).

Task 2.2 Pre-Construction Monument Survey

It is assumed the contractor will be required to preserve or install monument boxes as needed to aid in the process of re-establishing monuments and property corners. Consultant shall provide pre-construction survey services for preserving monuments, property corners and benchmarks described as follows:

- Includes establishing survey control and field locating existing centerline monuments, property corners and benchmarks within the limits of construction.
- Staking the location of box monuments that will be installed during construction.

Task 2.3 Post-Construction Monument Survey

Consultant shall provide post-construction survey services for preserving monuments, property corners and benchmarks described as follows:

- Checking monument locations after construction.
- Re-setting centerline monuments, property corners and benchmarks that are destroyed during construction.
- Preparation and filing of a Post Construction Record-of-Survey with Washington County Surveyor's Office.
- File the survey with Washington County.

Task 2 Deliverables

- Monument locations integrated into project plans
- Filed post-construction survey with Washington County

Task 3 - Utility Coordination

Minor utility conflicts are anticipated for this project relative to pavement elevation changes (overlays) and curb ramp replacements. Utility adjustments during paving operations are anticipated to include valve box (gas and water) adjustments and manhole (storm, sewer and other) adjustments. Depending on each curb ramp design, above ground utility facilities may also need to be adjusted. Adjustments to City-owned facilities will be incorporated into the design.

Utility coordination efforts will include:

- Develop a utility contact information list and email project information letters to all utility companies involved to explain nature of the work.
- Provide project preliminary plans to each utility at 50% and 90%.
- Maintain a record of correspondence with utility companies.
- Identify conflicts and issue conflict notices to impacted utilities.
- Coordinate with private utilities to resolve utility conflicts and finalize utility relocation requirements as appropriate. Affected utilities will be responsible for developing their relocation designs. Consultant shall review each utility's relocation plans and proposed schedule, provide written comments and issue approval.

Task 3 Deliverables

- Utility contact list
- Project information letters and conflict notices to each affected utility
- Reviewed utility relocation plans with comments and recommendations

Task 4 - Pavement Services

The City anticipates roadway rehabilitation will generally consist of overlay and grind and inlay paving where possible. In addition, some locations may require base repair or general reconstruction. The field investigation strategy will consist of shallow subsurface explorations, dynamic cone penetrometer (DCP), ground penetrating radar (GPR) testing, and field distress surveys. Information gathered during the field investigations will be used, together with the traffic data, to determine recommended rehabilitation strategies based on the AASHTO design procedure with the overall aim of minimizing grade increases and limiting overlays to 2 inches. The specific scope of services will include the following:

- Attend a meeting with City staff and the City's civil engineering representative to discuss pavement design approach, options, and project team plan.
- Review past City data regarding pavement construction, maintenance, and rehabilitation at each road section.
- Conduct GPR tests in the outside wheel track of the main travel lanes on each street using a 2 GHz truck-mounted horn antenna.
- Analyze truck-mounted GPR data and provide a plot of estimated AC thickness by pavement station. GPR data to be compared to the subsurface exploration data.
- Complete up to 64 pavement cores with locations at the discretion of the engineer for the purpose of GPR comparison and pavement condition assessment. Complete cores at crack locations where possible to verify top-down or bottom-up cracking. This assumes approximately one to three cores for the majority of street sections listed above and approximately 4 to 8 cores for the four segments with the greatest lengths. Cores to be terminated at the bottom of the AC.
- Conduct DCP testing at each core location. Tests will be conducted through the base aggregate (if present) and into the subgrade soil to estimate the thickness and resilient modulus of the base layer as well as the resilient modulus of the subgrade.
- Compare the results of core sampling to the GPR data and adjust GPR results as appropriate.
- Provide a report summarizing the above undertakings, findings, and rehabilitation recommendations.
- Conduct field visit with City staff with report in hand for use in reviewing site specific conditions and constraints. Conduct visit after ADA compliancy review so Consultant can also inform the City on which ramps will be reconstructed.
- Utilize pavement investigation data and field visit observations to develop final pavement rehabilitation recommendations and designs as part of Tasks 5, 6 and 7 below.

Task 4 Deliverables

- Report summarizing field investigation results and preliminary rehabilitation recommendations.

Task 5 - 50% Design

During this phase, Consultant will develop engineering plans which reflect typical grind and inlay and overlay treatments. The plans will establish appropriate project limits, identify the design sections and edge and longitudinal treatment details, address catch basin treatments to appropriately manage bicycle and drainage concerns, establish which curb ramps need to be modified or replaced to meet ADA requirements and identify typical traffic control. Striping plans will be deferred until the 90% stage. Plan sheet format will generally follow the same format used for the 2014 project. Specific requirements under this task include:

- Complete a review of the City's existing mapping, as-builts, aerial photographs, topographic surveys and GIS information.
- Integrate available base mapping into project plan sheets.
- ADA compliance review:
 - a. Obtain and review City curb ramp inventory information and incorporate data into the ADA compliancy review.
 - b. Complete office desktop review at each street crossing within paving limits utilizing readily available aerial and streetview imagery. Determine where existing curb ramps exist and where new curb ramps are needed. Where sidewalks do not exist, no curb ramps are required for ADA compliance. Document existing/future ramp locations and initial review findings for each ramp utilizing FHWA checklist for ADA compliancy.
 - c. Complete follow-up field evaluation of existing curb ramps and take measurements using FHWA checklist to determine ADA compliancy.
 - d. Make determination of where curb ramps need to be replaced and/or added to meet ADA requirements.
 - e. Develop conceptual sketches of curb ramps with approximate limits.
 - f. Show curb ramp replacement/retrofit locations in the 50% plans and incorporate into cost estimate.

- Develop pavement treatment recommendations and incorporate treatments for each street.
- Establish appropriate project limits, identify the design sections and edge and longitudinal treatment details, address catch basin treatments to appropriately manage bicycle and drainage concerns and identify signal loops (ODOT or other) which may be impacted.
- Prepare a 50% level cost estimate and bid schedule in a format acceptable to the City. Consultant will divide estimate and bid schedule into multiple bid schedules as directed by the City and depending on available funding.
- Prepare 50% construction plans (1" = 30' scale on half size sheets) and details as needed to clearly describe the work to be constructed. Construction plans shall, at a minimum, include civil notes, details and sections, and street improvement plans. For streets requiring more detail (arterials and some collectors), the construction plans may also include striping plans, signal detection, demolition and erosion control plans. It is assumed paving layout sheets and some details will be provided at this stage with striping layout sheets to be added at the 90% design level.

Task 5 Deliverables

- ADA compliance documentation, as necessary
- Electronic versions of the 50% plans, bid items and quantities, and cost estimate (PDF and Excel).

Task 6 - 90% Design

The 90% design submittal shall be advanced from the 50% submittal (incorporating all review comments). Additional tasks in addition to those listed above include:

- Coordinate with ODOT as needed for signal loop replacements, curb ramp replacement and other work as may be necessary on ODOT right-of-way.
- No other permitting needs are anticipated.
- Coordinate survey (Task 2) as needed for curb ramps to be reconstructed or added.
- Refine curb ramp retrofit/replacement designs in conformance with Public Right-of-Way Accessibility Guidelines (PROWAG) and the ODOT/APWA standard drawings utilizing survey mapping. Include sufficient curb ramp layout information in project detail sheets sufficient for quantity take-off and initial field layout purposes. Curb ramp details will generally include slope direction, basic ramp dimensions, curb type and surface utility information. For estimating purposes, it is assumed up to 109 intersection corners with curb ramps will be (re)constructed. It is assumed final ramp limits will be field verified during construction based on measurement of formwork.
- Prepare front end contract documents using the City's most recent standard forms and technical specifications in ODOT/APWA format.

Task 6 Deliverables

- Electronic versions of the complete 90% contract documents including front end documents, technical specifications, plans, bid items and quantities, and cost estimate (PDF, Word and Excel).

Task 7 - Final Design

The final design submittal shall be advanced from the 90% submittal (incorporating all review comments). Additional tasks in addition to those listed above include:

- Continue coordination with ODOT as necessary to develop a draft permit with conditions to be included in the bid documents. It is assumed the selected Contractor will sign and finalize the permit with ODOT prior to work on ODOT right-of-way.
- Refine curb ramp designs as necessary based on City and ODOT feedback.

Task 7 Deliverables

- Electronic versions of the complete contract documents including final front end documents, technical specifications, plans, bid items and quantities, and cost estimate (PDF, Word, Excel and CAD).
- Provide one (1) reproducible set of construction plans. The construction plans shall include an 11"x17" (at 1" = 30') set of construction drawings and details.

Task 8 - Bidding Services

It is assumed the City will print, advertise and be the primary point of contact for bidder inquiries. Consultant services will include:

- Assist the City as needed in responding to all bidder inquiries during the bid period.
- Provide necessary bid addenda to address bidder questions, as needed.

Task 9 – Construction Phase Services

The Consultant will provide construction contract administration, inspection and HMAC quality assurance testing with support from the City for public notifications and other coordination related items as needed. Construction phase services will include:

- Attending a preconstruction meeting.
- Reviewing requests for information, clarifications and change orders.
- Review of contractor submittals, shop drawings and field testing (particularly focused on asphalt) for conformance to the design requirements of the project and in accordance with the requirements of the contract documents. Consult with and advise City as to the acceptability of substitute and "or-equal" items proposed for use by the contractor.
- Construction inspection to monitor the progress and quality of the work, including preparation of construction inspection reports. Inspection time is assumed to include five visits per week, ten hours per visit over a 10 week construction period plus an additional four visits per week, eight hours per visit over a four week period during high production times.
- Curb ramp layout coordination with the construction contractor to confirm ramps meet ADA compliance. Coordination is anticipated to include a pre-pour meeting, layout of demolition limits, checking of forms for every ramp location and spot checking grades after the pour.
- HMAC quality assurance testing (assume two separate HMAC mix verification tests taken at the asphalt plant and two separate HMAC compaction testing days verification on newly placed HMAC)
- Assistance in determining if non-conforming contract work should be rejected.
- Attendance at progress meetings (assume weekly for a total of two months) with contractor and City to address construction related issues.
- Reviewing and making recommendations for contractor monthly progress payments (assumed four progress payments).
- Attendance during the final inspection, preparation of a "punch list", and recommendation of final acceptance of work by the City.
- Provide Record Drawings representative of the "as constructed" project. Record Drawings will be completed electronically and provided in PDF format.

Preliminary Sheet List

The following is the anticipated list of plan sheets based on an assumed 100% list:

Running Total	Sheets	Sheet Number	Description
1	1	Cover	Vicinity Map, Sheet Index
2	1	C-1	Overlay Quantities, Legend & Notes
3-5	3	C-2 to C-4	Paving Details
6-33	28	C-5 to C-32	Curb Ramp Details
34-60	1	L-1 to L-27	Paving Layout - Gaarde (Old)
	5		Paving Layout - North Dakota
	2		Paving Layout - 115th
	2		Paving Layout - 92nd Ave
	2		Paving Layout - Nimbus Ave
	2		Paving Layout - 72nd Ave
	1		Paving Layout - Dartmouth St
	1		Paving Layout - 78th Ave
	1		Paving Layout - 72nd Ave
	4		Paving Layout - Walnut St
	3		Paving Layout - Springwood Dr
	3		Paving Layout - Summercrest Dr
61-65		CS-1 to CS-5	Striping Details
67-92		S-1 to S-27	Striping Layout (same format as paving layout shts.)

Proposed Fee Estimate

MSA proposes to perform this work on a time and expenses basis with a total not to exceed amount of \$265,508 including design and construction services in accordance with the attached Exhibit A.

Schedule

The design schedule for the 2015 bid package will accommodate an anticipated bid opening in April 2015 with anticipated NTP to the construction contractor in June 2015 and construction beginning in July 2015.